



# COMPENDIUM OF TECHNOLOGIES @ IIT DELHI

September 2022



Foundation for Innovation and Technology Transfer



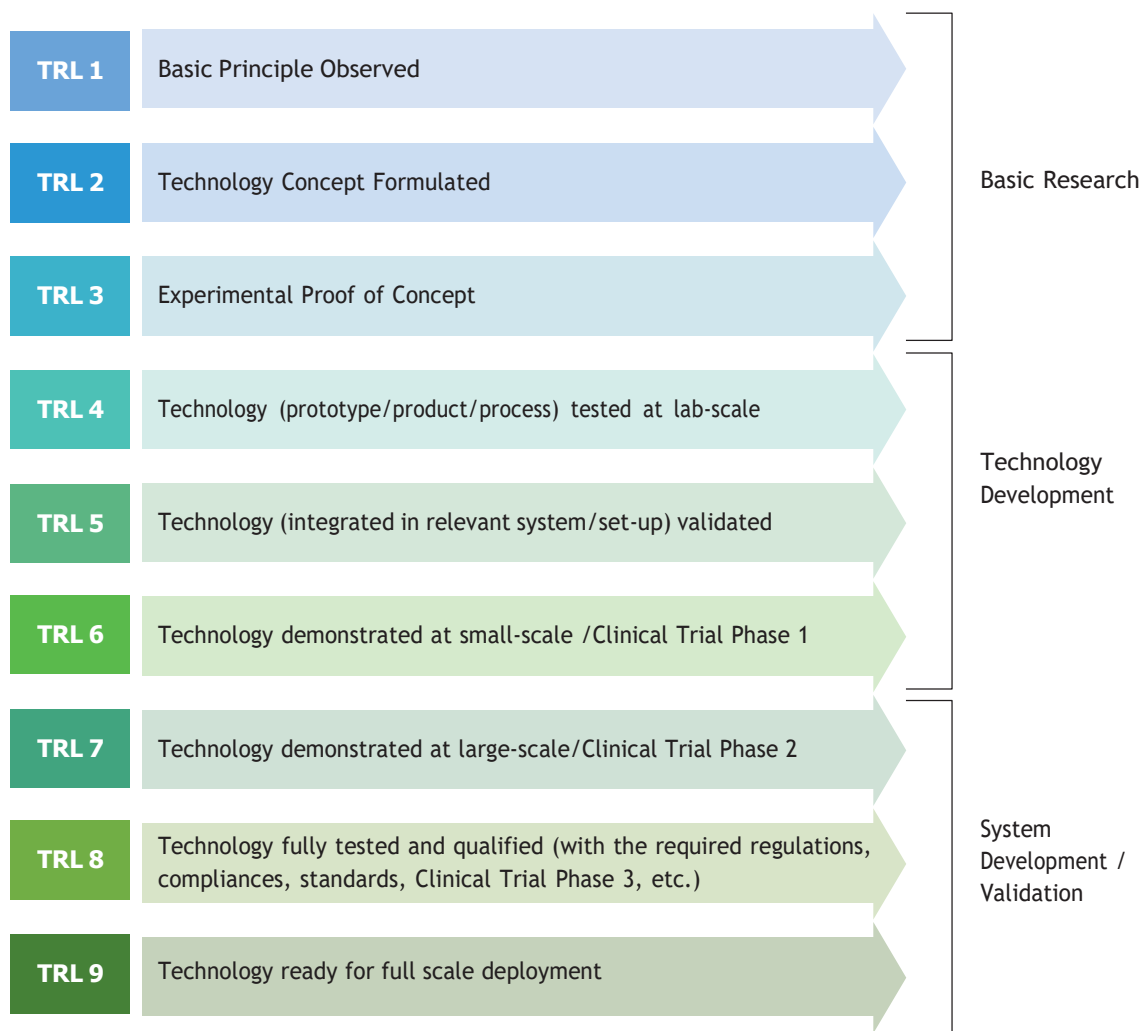
# **Compendium of Technologies @ IIT Delhi**

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# TECHNOLOGY READINESS LEVELS (TRL)

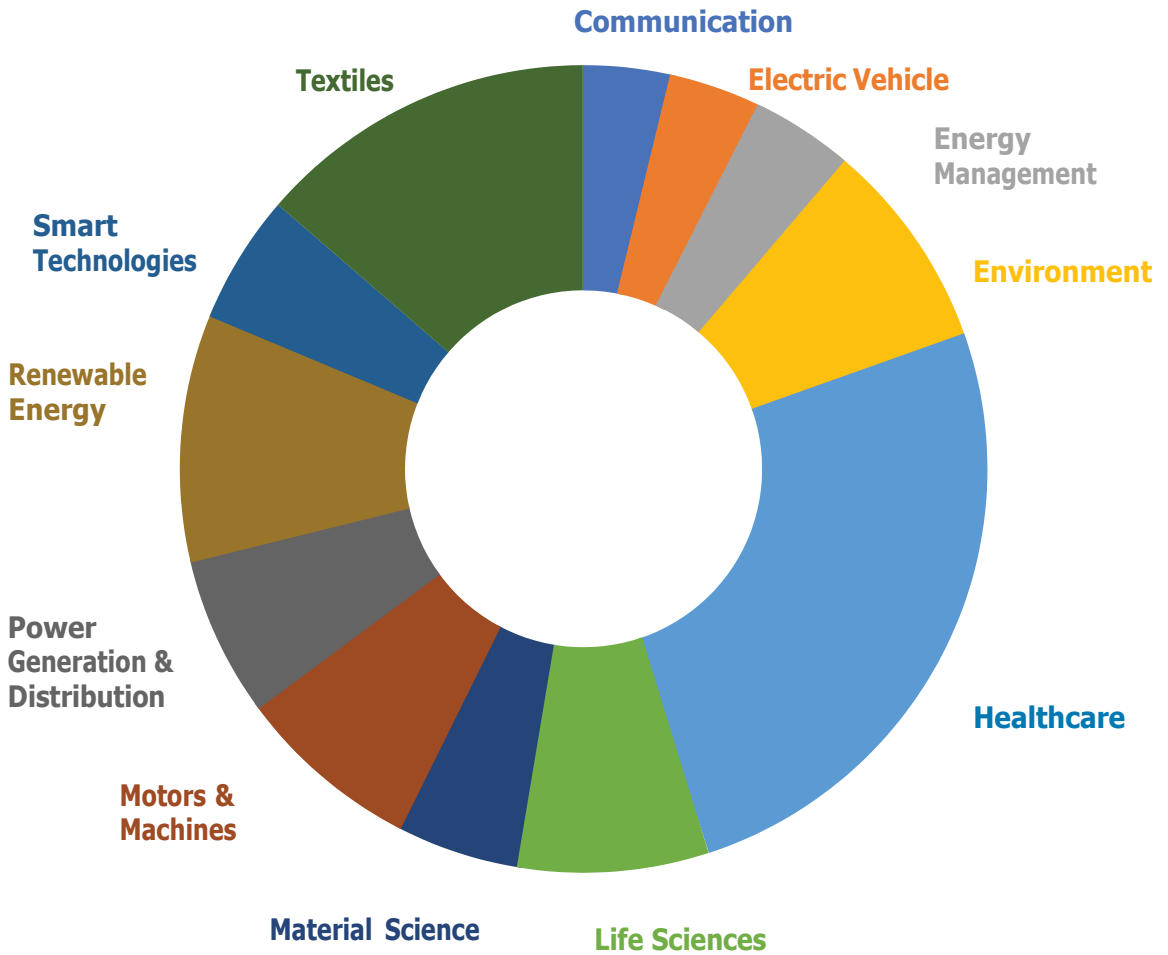


Majority of the research projects being pursued at an academic institution like IIT Delhi are likely to be at the stage of proof of concept, lab-scale testing and validation. In most cases, further development is capital intensive and requires intervention by the industry partners. However, many-a-times, the academic R&D successes fail to reach the industry due to lack of information on the potential technologies and their mapping to user requirements.

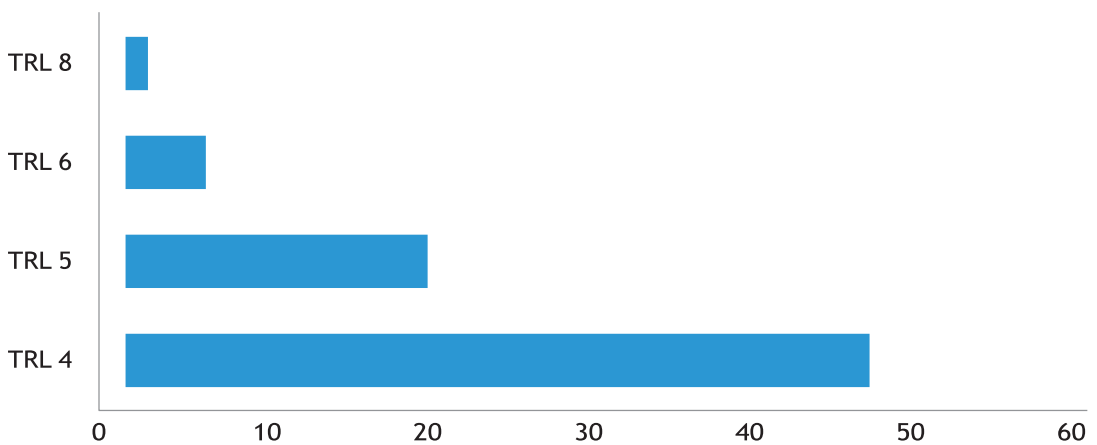
The present technology compendium is being brought out with an aim to reach out to the industry partners and showcase the technical and innovative prowess of the scientific and research community at IIT Delhi. In this compendium, the technologies which fall in the bracket TRL 4 and above have been put together for ready access by various stakeholders. The compendium also lists out some of the technologies which have been licensed out to industrial partners for commercialization in the last 5 years.

The list herein, though not exhaustive, reflects the range of technical domains where strong expertise resides with the Institute groups. The proven expertise will help the industry to pick up appropriate commercialisable ideas.

# DISTRIBUTION OF TECHNOLOGIES ACROSS SECTORS / AREAS



## No. of Technologies



# LIST OF TECHNOLOGIES

S. No.	Title of Technology	Inventor	Affiliation	Technology Readiness Level
<b>I. Domain - Communication</b>				
1	Efficient MIMO systems with full diversity	Prof. Manav R. Bhatnagar	Department of Electrical Engineering	4
2	Dielectric rod based mechanical tuning technique for Substrate Integrated Waveguide (SIW) circuits	Prof. Shibani K. Koul	Centre for Applied Research in Electronics	4
3	Polarization insensitive metamaterial enabled multiband absorber over a wide spectrum (X - to - K-bands)	Prof. Shibani K. Koul	Centre for Applied Research in Electronics	4
<b>II. Domain - Electric Vehicle</b>				
4	A multi-purpose charging station for e-rickshaws in rural areas	Prof. Bhim Singh	Department of Electrical Engineering	4
5	A power factor correction converter-based charger for light electric vehicles	Prof. Bhim Singh	Department of Electrical Engineering	4
6	An EV charging architecture to enable continuous charging with Grid intermittency	Prof. Bijaya K. Panigrahi	Department of Electrical Engineering	6
<b>III. Domain - Energy Management</b>				
7	A smart appliance control solution for a building energy management system	Prof. Bijaya K. Panigrahi	Department of Electrical Engineering	6
8	An ultra-battery energy storage system for load frequency control in a multi-area power network	Prof. Bhim Singh	Department of Electrical Engineering	5
9	Smart Energy Metering Solution	Prof. Bijaya K. Panigrahi	Department of Electrical Engineering	5
<b>IV. Domain - Environment</b>				
10	Waste debris collection apparatus	Prof. Amit K. Jain	Department of Electrical Engineering	6
11	Pollution monitoring system	Prof. Shouri Chatterjee	Department of Electrical Engineering	4
12	Air filters for filtration of airborne particles	Prof. Dipayan Das	Department of Textile and Fibre Engineering	5

S. No.	Title of Technology	Inventor	Affiliation	Technology Readiness Level
13	Recyclable smart mesh for on demand separation of oily water	Prof. Jitendra P. Singh	Department of Physics	4
14	Water purification system	Prof. Syed W. Ali	Department of Textile and Fibre Engineering	4
15	Materials for removal of heavy metal ions from aqueous waste	Prof. Josemon Jacob	Department of Materials Science and Engineering	4
16	Materials for anion removal from aqueous waste and desalination	Prof. Josemon Jacob	Department of Materials Science and Engineering	4
<b>V. Domain - Healthcare</b>				
17	An assistive transfer system for wheelchair users	Prof. P. V. Madhusudhan Rao	Department of Design	6
18	A turbine based Low-Cost Ventilator	Prof. P. V. Madhusudhan Rao	Department of Design	6
19	Process for preparing vascular stents	Prof. Pulak M. Pandey	Department of Mechanical Engineering	4
20	Exoskeleton device for upper limb rehabilitation	Prof. Amit Mehndiratta	Centre for Biomedical Engineering	8
21	Wearable gait analysis	Prof. Deepak Joshi	Centre for Biomedical Engineering	5
22	Neonatal incubator	Prof. Sidh N. Singh	Department of Applied Mechanics	4
23	Antimicrobial formulation for porous and non-porous substrates	Prof. Ashwini K. Agrawal	Department of Textile and Fiber Engineering	4
24	Tubular scaffold	Prof. Pulak M. Pandey	Department of Mechanical Engineering	4
25	Digital mosso ergograph	Prof. Deepak Joshi	Centre of Biomedical Engineering	5
26	A saliva based non-invasive glucometer	Prof. Sandeep K. Jha	Centre for Biomedical Engineering	4
27	Layered hydrogel scaffold for the regulation of diabetic wound bed for faster healing	Prof. Jayanta Bhattacharyya	Centre for Biomedical Engineering	4
28	Peptide mediated ocular drug delivery (Natamycin and Ribloflavin)	Prof. Archana Chugh	Kusuma School of Biological Sciences	5

S. No.	Title of Technology	Inventor	Affiliation	Technology Readiness Level
29	Therapeutic peptides	Prof. Archana Chugh	Kusuma School of Biological Sciences	4
30	A medicament for the treatment of diseases by biofilm forming microorganism	Prof. Seyed E. Hasnain	Centre for Biomedical Engineering	4
31	Ranibizumab biosimilar	Prof. Anurag S. Rathore	Department of Chemical Engineering	4
32	Trastuzumab biosimilar	Prof. Anurag S. Rathore	Department of Chemical Engineering	4
33	Acellular artificial skin substitute for second degree burn	Prof. Veena Koul	Centre for Biomedical Engineering	5
34	Ocular drug delivery system (Ranibizumab)	Prof. Dinesh Kalyanasundaram	Centre for Biomedical Engineering	5
35	A 3D bioprinted scar tissue model	Prof. Sourabh Ghosh	Department of Textile and Fibre Engineering	4
36	Decontamination wipes	Prof. Bhupendra S. Butola	Department of Textile and Fibre Engineering	5
<b>VI. Domain - Life Sciences</b>				
37	Natural antimicrobials for food preservation	Prof. Sampa Saha	Department of Material Science and Engineering	5
38	Stabilization of biotherapeutics at high temperature	Prof. Anurag S. Rathore	Department of Chemical Engineering	4
39	Pegylation to enhance pharmacokinetic properties of proteins	Prof. Anurag S. Rathore	Department of Chemical Engineering	4
40	Production of recombinant human serum albumin (rHSA) using E. coli as an expression system	Prof. Tapan Chaudhari	Department of Biochemical Engineering and Biotechnology	4
41	Production of serratiopeptidase protein using E. coli as an expression system	Prof. Tapan Chaudhari	Department of Biochemical Engineering and Biotechnology	4
42	Probiotic formulation	Prof. Shilpi Sharma	Department of Biochemical Engineering and Biotechnology	4

S. No.	Title of Technology	Inventor	Affiliation	Technology Readiness Level
<b>VII. Domain - Material Science</b>				
43	Green chemistry method for preparing biologically active substituted alkanes from aldehydes and ketones	Prof. Chinmoy K. Hazra	Department of Chemistry	4
44	Antimicrobial coating against implant infection	Prof. Sampa Saha	Department of Material Science and Engineering	4
45	Highly ordered poly-high internal phase emulsions using co-flow microfluidic device	Prof. Supreet S. Bagha	Department of Mechanical Engineering	5
46	New class of pH-responsive biodegradable materials with antibacterial properties	Prof. Josemon Jacob	Department of Materials Science and Engineering	4
<b>VIII. Domain - Motors &amp; Machines</b>				
47	A system for modulating a brushless DC motor	Prof. Bhim Singh	Department of Electrical Engineering	5
48	An improved ventilation exhaust fan for Industry	Prof. Bhim Singh	Department of Electrical Engineering	4
49	A system for controlling the speed/torque of a switched reluctance motor	Prof. Bhim Singh	Department of Electrical Engineering	4
50	An environment friendly metal-working fluid	Prof. Deepak Kumar	Centre of Automotive Research and Tribology	4
51	Robotic pipe crawler for inspection of pipe	Prof. Balachanran Premchandran	Department of Mechanical Engineering	5
52	A solar PV-battery based hybrid water pumping system for rural areas	Prof. Bhim Singh	Department of Electrical Engineering	5
<b>IX. Domain - Power Generation &amp; Distribution</b>				
53	A transformer-less multilevel inverter system	Prof. Sumit K. Chattopadhyay	Department of Energy Science and Engineering	4
54	Reduction of torque ripple in double inverter fed wound rotor induction machine	Prof. Amit K. Jain	Department of Electrical Engineering	4



S. No.	Title of Technology	Inventor	Affiliation	Technology Readiness Level
55	A virtual synchronous machine for synchronizing three phase inverters with an electricity grid	Prof. Bhim Singh	Department of Electrical Engineering	4
56	A loop power flow controller (LPFC) for DC distribution networks (DCDS)	Prof. Sukumar Mishra	Department of Electrical Engineering	4
57	A microgrid control framework for preventing power blackouts	Prof. Bhim Singh	Department of Electrical Engineering	4
<b>X. Domain - Renewable Energy</b>				
58	Catalyst composition for conversion of sulfur trioxide for hydrogen production process	Prof. Sreedevi Upadhyayula	Department of Chemical Engineering	5
59	A microgrid with seamless transfer capability between utility grid and diesel generator	Prof. Bhim Singh	Department of Electrical Engineering	4
60	Production of liquid fuel from waste plastics	Prof. Kamal K. Pant	Department of Chemical Engineering	5
61	Vanadium redox flow battery	Prof. Anil Verma	Department of Chemical Engineering	8
62	Micro emulsion fuel	Prof. Ashok N. Bhaskarwar	Department of Chemical Engineering	4
63	E-waste plastic into fuel and metal recovery	Prof. Kamal K. Pant	Department of Chemical Engineering	5
64	A solar irrigation pump without need of a mechanical position sensor	Prof. Bhim Singh	Department of Electrical Engineering	4
65	Biotransformation of asphaltene through microbial consortium	Prof. Preeti Srivastava	Department of Biochemical Engineering and Biotechnology	4
<b>XI. Domain - Smart Technologies</b>				
66	IoT based person identification system using footfall signature	Prof. Subrat Kar	Department of Electrical Engineering	4
67	A membrane-less variable focus liquid lens and an imaging device	Prof. Supreet S. Bahga	Department of Mechanical Engineering	5
68	Data-smart power meters	Prof. Swades De	Department of Electrical Engineering	4

S. No.	Title of Technology	Inventor	Affiliation	Technology Readiness Level
69	Field-effect transistor device for the detection of dissolved ammonia in plasma	Prof. Shibhan K. Koul	Centre for Applied Research in Electronics	5
<b>XII. Domain - Textiles</b>				
70	Shape memory polymers for designing responsive textiles	Prof. Bipin Kumar	Department of Textile and Fibre Engineering	5
71	Electro-conductive fabric	Prof. Dipyan Das	Department of Textile and Fiber Engineering	4
72	A dynamic yarn pull-out testing device	Prof. Abhijit Majumdar	Department of Textile and Fiber Engineering	6
73	Insect repellent and antibacterial solution for textiles	Prof. S. Wazed Ali	Department of Textile and Fibre Engineering	4
74	Natural dye from pineapple fruit	Prof. Bhupendra S. Butola	Department of Textile and Fibre Engineering	4
75	Development of a new multifunctional natural textile dye from peanut shell extract	Prof. Bhupendra S. Butola	Department of Textile and Fibre Engineering	4
76	Multifunctional fabric	Prof. Samrat Mukhopadhyay	Department of Textile and Fibre Engineering	8
77	A flame-retardant composition and its applications	Prof. S. Wazed Ali	Department of Textile and Fibre Engineering	4
78	Novel finish based on silicone for multifunctional finishing of textiles	Prof. Javed N. Sheikh	Department of Textile and Fibre Engineering	5
79	Multifunctional disperse dyes	Prof. Javed N. Sheikh	Department of Textile and Fibre Engineering	4
80	Multifunctional microcapsules	Prof. Javed N. Sheikh	Department of Textile and Fibre Engineering	5



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